

# Differentiation between autoimmune pancreatitis and pancreatic carcinoma by using diffusion weighted MR imaging

Z. Yang<sup>1</sup>, C. Zhou<sup>1</sup>, M. Chen<sup>1</sup>, X. Ye<sup>1</sup>, M. Zhang<sup>1</sup>, and Y. Tan<sup>1</sup>

<sup>1</sup>Department of Radiology, Beijing Hospital, Beijing, Beijing, China, People's Republic of

## INTRODUCTION

Autoimmune pancreatitis (AIP) is a relatively rare type of chronic pancreatitis caused by autoimmune mechanism [1-2]. Although some imaging findings have been reported to be helpful to the diagnosis of AIP, the clinical and imaging features of this entity may be misleading and suggest the presence of a malignant tumor in some cases [1-2]. Diffusion-weighted imaging (DWI) can detect the Brownian motion of water molecular in vivo and has been used to improve the detection and characterization of ischemic lesions of the brain. DWI has also been attempted in the organs of body such as liver, kidney and prostate, and can supply useful information for the evaluation of diseases [3-6]. To our knowledge, however DWI has not been used to diagnosis of AIP. The goal of this study is to evaluate the role of DWI in the differentiation between AIP and pancreatic carcinoma (PCA).

## METHODS

Conventional MR imaging, dynamic MR imaging, and DWI were performed in 11 patients with AIP and 17 patients with PCA. All cases were proved histopathologically or clinically. MR imaging was performed at 1.5 T MR scanner (Excite/HD, GE System; or Symphony/Avento, Siemens System), and a phased array coils was used to receive MR signal. The conventional imaging pulse sequences included fat suppressed FSE/TSE T2WI, pre- and postcontrast fat suppressed 3D spoiled GRE T1WI. Axial DWI was performed in all cases by using a single shot SE-EPI sequence with the following parameters: TR 2000 ms, TE 59-76ms, section thickness 6 mm with a gap of 1.5 mm, and b values of 0 and 800 s/mm<sup>2</sup>. Apparent diffusion coefficients were measured for every case.

## RESULTS

Diffusion or focal enlargement of the pancreas were showed in patients with AIP, and capsulelike rim around the enlarged pancreas was demonstrated in 7 cases. On fat-suppressed T2WI, all AIP lesions showed slightly hyperintense, while PCA lesions showed slightly hyperintense in 6 cases, isointense in 7 cases, and slightly hypointense in 4 cases. On precontrast fat-suppressed SPGR T1WI, both AIP and PCA lesions showed relatively hypointense in all cases. Reduced perfusion was found in all AIP and PCA lesions on arterial phase of dynamic MR images, and delayed enhancement was showed in all AIP lesions and in PCA lesions of 8 patients. On DWI, all AIP lesions showed isointense or mildly hypointense, while PCA lesions showed mildly or moderately hyperintense in 13 case and isointense in the other 4 cases. The mean ADC value of AIP lesions was  $1.65 \times 10^{-3} \text{ mm}^2/\text{s}$  (ranged from  $1.39 \times 10^{-3} \text{ mm}^2/\text{s}$  to  $2.03 \times 10^{-3} \text{ mm}^2/\text{s}$ ), while the mean ADC value of PCA lesions was  $1.08 \times 10^{-3} \text{ mm}^2/\text{s}$  (ranged from  $0.81 \times 10^{-3} \text{ mm}^2/\text{s}$  to  $1.44 \times 10^{-3} \text{ mm}^2/\text{s}$ ) ( $P < 0.05$ ).

## DISCUSSION AND CONCLUSION

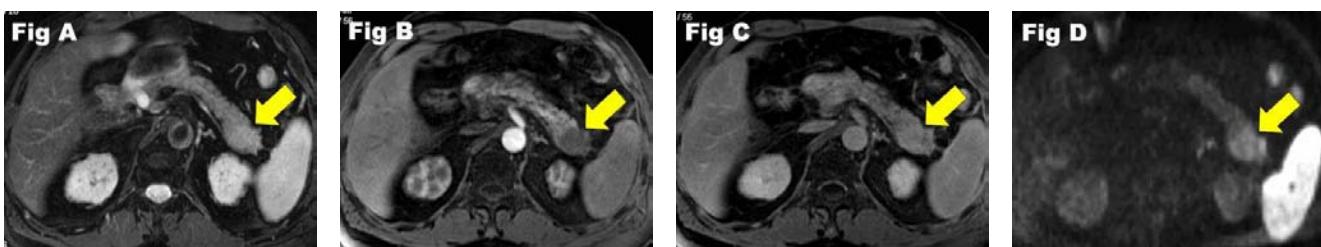
AIP is a relatively rare type of chronic pancreatitis that may be caused by an autoimmune mechanism [1-2]. Being different from common chronic pancreatitis, AIP is reversible when diagnosed and treated correctly [1-2]. Unfortunately, the entity do not showed characteristic clinical features, and some patients may be misdiagnosed as PCA and accept unnecessary operation. In recent years, imaging methods have provided us with more and more imaging information to suggest AIP, including capsulelike rim around the pancreas, diffuse irregular stricture of the pancreatic duct, diffuse or focal enlargement of the pancreas along with hypointensity on T1-weighted MR images and delayed enhancement on dynamic CT and MR images. However, some AIP patients, just like some cases in this study, do not show any characteristic imaging findings, and their diagnosis is still difficult.

DWI has recently been used to evaluate tumors of the body, and most malignant tissues have showed relatively decreased ADC values, although the mechanism is still unclear [3-6]. To our knowledge, however, DWI has never been used to diagnose AIP or to differentiate AIP from PCA. In this study, conventional MR imaging and DWI were performed in both patients with AIP and patients with PCA. Most PCA lesions showed hyperintense on DWI, while all AIP lesions showed isointense or mildly hypointense on DWI. The mean ADC value of AIP lesions was significantly higher than that of PCA lesions ( $1.65 \times 10^{-3} \text{ mm}^2/\text{s}$  versus  $1.08 \times 10^{-3} \text{ mm}^2/\text{s}$ ).

In Conclusion, our preliminary study indicates that AIP and PCA show different signal intensity and different ADC on DWI, and that DWI is a helpful tool to differentiate AIP from PCA.

## REFERENCE

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**Fig 1. Adenocarcinoma the pancreatic tail in a 65-year-old man.** The lesion (yellow arrow) showed mildly hyperintense on fat saturated T2WI (Fig A), decreased perfusion on arterial phase image (Fig B), delayed enhancement on equilibrium phase image (Fig C), and moderately hyperintense on DWI (Fig D). The ADC value of the lesion was  $1.03 \times 10^{-3} \text{ mm}^2/\text{s}$ . An adenocarcinoma was confirmed by surgery.



**Fig 2. Focal autoimmune pancreatitis of the pancreatic tail in a 67-year-old man.** The lesion (yellow arrow) also showed mildly hyperintense on fat saturated T2WI (Fig A), decreased perfusion on arterial phase image (Fig B), delayed enhancement on equilibrium phase image (Fig C). However, compared with the normal pancreatic parenchyma, the lesion (yellow arrow) showed mildly hypointense on DWI (Fig D), and the ADC value of the lesion was  $1.84 \times 10^{-3} \text{ mm}^2/\text{s}$ . Imaging abnormalities resolved on follow-up fat suppressed T1WI (Fig E) after 4 months of steroid therapy.